

What is claimed is:

1. A method for processing an Arbitrary Order Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects, said method transforming said Arbitrary Order Signal Sequence into a Streamable Signal Sequence, said method comprising:

determining a network of references between said plurality of Objects, said step of determining including identifying at least one Referenced Object and a corresponding Referencing Object containing an Object Reference to said Referenced Object; and

placing said Referenced Object in said Streamable Signal Sequence prior to said corresponding Referencing Object, responsive to said determining step, to form said Streamable Signal Sequence.

2. A method in accordance with claim 1, wherein said Referenced Object is a Shared Referenced Object that has a first Object Reference from a first Referencing Object and a second Object Reference from a second Referencing Object to said Shared Referenced Object, said method further comprising:

identifying said Shared Referenced Object and said corresponding first Referencing Object and said second Referencing Object; and

placing said Shared Referenced Object in said Streamable Signal Sequence prior to either of said first Referencing Object and said second Referencing Object to form said Streamable Signal Sequence.

3. A method in accordance with claim 2, said method further comprising:

generating Last Reference Summary Information about said Shared Referenced Object identifying the last of said first Referencing Object and said second Referencing Object in said Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said Referenced Object; and

inserting said Last Reference Summary Information into said Streamable Signal Sequence.

4. A method in accordance with claim 1, wherein said Referenced Object is a non-shared Referenced Object, said method further comprising:

generating Last Reference Summary Information about said Referenced Object identifying said Referencing Object in the Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said Referenced Object; and

inserting said Last Reference Summary Information into said Streamable Signal Sequence.

5. A method in accordance with claim 1, wherein said Referenced Object is a non-shared Referenced Object from a corresponding Referencing Object, where said Referencing Object has an Object Reference from said Referencing Object to said Referenced Object, said method further comprising:

said step of determining said network of references between said plurality of Objects, further includes the step of identifying the size of the portion of said Referencing Object following said Object Reference to said non-shared Referenced Object; and

placing said Referenced Object in said Streamable Signal Sequence prior to said corresponding Referencing Object if said Referenced Object is smaller than said portion of said Referencing Object following said Object Reference to said non-shared Referenced Object, and placing said Referenced Object in said Streamable Signal Sequence after its corresponding Referencing Object if said Referenced Object is larger than said portion of

said Referencing Object following said Object Reference to said non-shared Referenced Object, to form said Streamable Signal Sequence.

6. A method in accordance with claim 1, further comprising:

generating Memory Requirement Summary Information regarding the amount of memory required to process said Streamable Signal Sequence; and

inserting said Memory Requirement Summary Information into said Streamable Signal.

7. A method in accordance with claim 1, further comprising:

generating identification Summary Information to identify said Streamable Signal Sequence; and

inserting said identification Requirement Summary Information into said Streamable Signal.

8. A method in accordance with claim 1, further comprising:

generating non-shared Summary Information to indicate that all Objects in said Streamable Signal Sequence are non-shared; and

inserting said non-shared Summary Information into said Streamable Signal.

9. A method in accordance with claim 1, wherein said Arbitrary Order Signal Sequence is a Portable Document Format (PDF) file, said method further comprising:

generating identification Summary Information to identify said Streamable Signal Sequence as a streamable PDF file; and

inserting said identification Summary Information into said Streamable Signal.

10. A method in accordance with claim 9, wherein each of said Objects are PDF objects, and said each of said Object References is a PDF object is a PDF Object Identifier.

11. A method in accordance with claim 1, further comprising

generating Summary Information regarding at least one of said Referenced Object and said Referencing Object, wherein said Summary Information is a PDF xref table; and

inserting said Summary Information into said Streamable Signal Sequence.

12. A method for processing an Arbitrary Order Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects, said method transforming said Arbitrary Order Signal Sequence into a Streamable Signal Sequence, said method comprising:

determining a network of references between said plurality of Objects, said step of determining including identifying at least one Referenced Object and a corresponding Referencing Object containing an Object Reference to said Referenced Object;

splitting said Referencing Object into a first Referencing Object and a second Referencing Object such that the Object Reference to said Referenced Object is at the end of said first Referencing Object; and

placing said Referenced Object between said first Referencing Object and said second Referencing Object created by said step of splitting said Referencing Object in said Streamable Signal Sequence.

13. A method for processing an Arbitrary Order Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects, said method transforming said Arbitrary Order Signal Sequence into a Streamable Signal Sequence, said method comprising:

determining a network of references between said plurality of Objects, said step of determining including identifying at least one Referenced Object that is referenced by a first Referencing Object and a second Referencing Object, each of said first and second Referencing Objects containing an Object Reference to said Referenced Object;

replicating said Referenced Object into a first replicated Referenced Object and a second Referenced Object;

placing said first replicated Referenced Object in said Streamable Signal Sequence prior to said first Referencing Object in said Streamable Signal Sequence; and

placing said second replicated Referenced Object in said Streamable Signal Sequence prior to said second Referencing Object in said Streamable Signal Sequence.

14. A method for processing an Arbitrary Order Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects, said method transforming said Arbitrary Order Signal Sequence into a Streamable Signal Sequence, said method comprising:

determining a network of references between said plurality of Objects, said step of determining including identifying at least one Referenced Object and a corresponding Referencing Object containing an Object Reference to said Referenced Object;

placing said Referenced Object in said Streamable Signal Sequence prior to said corresponding Referencing Object, responsive to said determining step, to form said Streamable Signal Sequence;

said step of determining a network of references between said plurality of Objects including identifying at least one shared Referenced Object that is referenced by a first Referencing Object and a second Referencing Object, each of said first and second Referencing Objects containing an Object Reference to said shared Referenced Object;

replicating said shared Referenced Object into a first replicated Referenced Object and a second replicated Referenced Object;

placing said first replicated Referenced Object in said Streamable Signal Sequence prior to said first Referencing Object in said Streamable Signal Sequence;

placing said second replicated Referenced Object in said Streamable Signal Sequence prior to said second Referencing Object in said Streamable Signal Sequence;

generating Summary Information regarding at least one of said Referenced Object, said Referencing Object, said shared Referenced Object, said first Referencing Object, said second Referencing Object, said first replicated Referenced Object and said second replicated Referenced Object; and

inserting said Summary Information into said Streamable Signal Sequence.

15. A method in accordance with claim 14, further comprising:

said step of determining a network of references between said plurality of Objects including identifying at least one non-shared Referenced Object and a corresponding third Referencing Object containing an Object Reference to said non-shared Referenced Object;

splitting said third Referencing Object into a fourth Referencing Object and a fifth Referencing Object such that the Object Reference to said non-shared Referenced Object is at the end of said third Referencing Object; and

placing said non-shared Referenced Object between said fourth Referencing Object and said fifth Referencing Object created by said step of splitting said third Referencing Object in said Streamable Signal Sequence.

16. A method in accordance with claim 15, said method further comprising:

generating Last Reference Summary Information about said Shared Referenced Object identifying the last of said first Referencing Object and said second Referencing Object in said Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said Referenced Object; and

inserting said Last Reference Summary Information into said Streamable Signal Sequence.

17. A method in accordance with claim 14, wherein said Referenced Object is a non-shared Referenced Object, said method further comprising:

generating Last Reference Summary Information about said Referenced Object identifying said Referencing Object in the Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said Referenced Object; and

inserting said Last Reference Summary Information into said Streamable Signal Sequence.

18. A method in accordance with claim 14, wherein said Referenced Object is a non-shared Referenced Object from a corresponding Referencing Object, where said Referencing

Object has an Object Reference from said Referencing Object to said Referenced Object, said method further comprising:

said step of determining said network of references between said plurality of Objects, further includes the step of identifying the size of the portion of said Referencing Object following said Object Reference to said non-shared Referenced Object; and

placing said Referenced Object in said Streamable Signal Sequence prior to said corresponding Referencing Object if said Referenced Object is smaller than said portion of said Referencing Object following said Object Reference to said non-shared Referenced Object, and placing said Referenced Object in said Streamable Signal Sequence after its corresponding Referencing Object if said Referenced Object is larger than said portion of said Referencing Object following said Object Reference to said non-shared Referenced Object, to form said Streamable Signal Sequence.

19. A method in accordance with claim 14, further comprising:

generating Memory Requirement Summary Information regarding the amount of memory required to process said Streamable Signal Sequence; and

inserting said Memory Requirement Summary Information into said Streamable Signal.

20. A method in accordance with claim 14, further comprising:

generating identification Summary Information to identify said Streamable Signal Sequence; and

inserting said identification Summary Information into said Streamable Signal.

21. A method in accordance with claim 14, further comprising:



generating non-shared Summary Information to indicate that all Objects in said Streamable Signal Sequence are non-shared; and

inserting said non-shared Summary Information into said Streamable Signal.

22. A method in accordance with claim 14, wherein said Arbitrary Order Signal Sequence is a PDF file, said method further comprising:

generating identification Summary Information to identify said Streamable Signal Sequence as a streamable PDF file; and

inserting said identification Summary Information into said Streamable Signal.

23. A method in accordance with claim 14, wherein each of said Objects are PDF objects, and said each of said Object References is a PDF object is a PDF Object Identifier.

24. A method in accordance with claim 14, wherein said Summary Information includes a PDF xref table.

25. A method for processing a Streamable Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects and including at least one non-shared Referenced Object and a corresponding Referencing Object containing an Object Reference to said non-shared Referenced Object, said Streamable Signal Sequence further having said non-shared Referenced Object in said Streamable Signal Sequence placed prior to said corresponding Referencing Object, said Streamable Signal Sequence further including Last Reference Summary Information about said non-shared Referenced Object identifying said Referencing Object in the Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said non-shared Referenced Object, said method comprising:

receiving said non-shared Referenced Object and said Last Reference Summary Information;

storing said non-shared Referenced Object in a memory;

processing said Referencing Object containing said Object Reference to said non-shared Referenced Object; and

deleting, responsive to Last Reference Summary Information, said non-shared Referenced Object from said memory.

26. A method for processing a Streamable Signal Sequence having a plurality of Objects and a plurality of Object References between said plurality of Objects and including at least one shared Referenced Object having a first Object Reference from a first Referencing Object and a second Object Reference from a second Referencing Object to said Shared Referenced Object, said Streamable Signal Sequence further having said Shared Referenced Object placed prior to either of said first Referencing Object and said second Referencing Object, said Streamable Signal Sequence further comprising Last Reference Summary Information about said Shared Referenced Object identifying the last of said first Referencing Object and said second Referencing Object in said Streamable Signal Sequence as corresponding to the last Referencing Object Signal containing an Object Reference to said Shared Referenced Object; said method comprising:

receiving said Shared Referenced Object and said Last Reference Summary Information;

storing said Shared Referenced Object in a memory;

processing said first Referencing Object containing said Object Reference to said Shared Referenced Object;

processing said second Referencing Object containing said Object Reference to said Shared Referenced Object; and

deleting, responsive to Last Reference Summary Information, said Shared Referenced Object from said memory.